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14. ABSTRACT The purpose of this study is to identify the determinants of outpatient mental health services utilization among deployed service members and their families using the Anderson Behavioral Model framework. Hierarchical regression analysis was used to examine the impact of predisposing (demographic), enabling (socio-economic) and need (health status) population factors on outpatient mental health services utilization behavior among service members and their families at an Army Medical Center. Using data covering three fiscal years from 2005 through 2007, 33,860 direct care and 27,300 purchased care outpatient mental health visits were analyzed to identify the factors that influenced mental health service use to determine if outpatient mental health services utilization was higher among service members who deployed to Iraq or Afghanistan and their families. The data partially supported the hypotheses. The predisposing factors, beneficiary category and branch of service explained about 1% of the variance in utilization in direct care settings and up to 13% in purchased care settings while the enabling resource, provider specialty accounted for 7% and 9% of the shared variance in direct and purchased care respectively. The adjusted R square for the direct care model was .071 and .158 for the purchased care model. Although the PTSD diagnosis variable was associated with greater mental health service utilization, need factors as a whole were not a consistent predictor of greater visits in direct and purchased care settings.					
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Their Families

Presented to MAJ Eric Schmacker, PhD, MHA, FACHE

In partial fulfillment of the requirements for
HCA 5661: Administrative Residency: Preceptor/Faculty Reader

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Disclaimer

“The views expressed in this paper are those of the presenter and do not reflect official views of the Department of the Army or the U.S. Government except where noted”, per AR 360-1 The Army Public Affairs Program, Chapter 6, Speakers and Clearance of Speeches, Manuscripts, and Internal Information Section 6-8, Guidelines, P.24, 15 September 2000.

Statement of Ethical Conduct in Research

The author declares no conflicts of interest or financial interests in any product or service mentioned in this article, including grants, employment, stock holdings, gifts, or honoraria. There was no personally identifiable Protected Health Information (PHI) accessed during this cross sectional analysis and therefore the confidentiality of individual members of the study population was protected at all times throughout the study.

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Abstract

The stress associated with extended separations due to military deployment can create significant emotional problems for service members and their families. The current sustained combat operations in Iraq and Afghanistan by the U.S. military requires a continual assessment of the mental health of service members who have deployed to combat and to understand if there is a difference in service use among this population.

This study analyzed the determinants of outpatient mental health services utilization at Brooke Army Medical Center (BAMC) within the framework of the Anderson Behavioral Model (ABM), which examines the impact of predisposing (demographic), enabling (socio-economic), and need factors (health status) on health services utilization behavior. Using the Military Health System Data Mart (M2), data covering three fiscal years from 2005 through 2007, were used to analyze 33,860 direct care and 27,300 purchased care outpatient mental health observations or visits at the BAMC Behavioral Health Clinic. The study used hierarchical regression analyses to examine the impact of predisposing, enabling and need factors on outpatient mental health service utilization. The data partially support the hypotheses. The predisposing variables, beneficiary category and branch of service, consistently explained about 1% of the variance in mental health service utilization in direct care settings and up to 13% in purchased care settings. Provider specialty was the only significant enabling variable in both direct and purchased care visits and accounted for 7% and 9% respectively of the shared variance in the models. The adjusted R^2 for the direct care model was .071 and for purchased care .158. Although the diagnosis variable of post-traumatic stress disorder was associated with greater mental health service utilization, need factors, as a whole, were neither a consistent predictor in visits where the sponsor deployed to combat nor for those where the sponsor did not deploy.

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Introduction

Health and the Purpose of a Health Care System

The World Health Organization (WHO) defines health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (1946). WHO further describes health care as all the goods and services designed to promote health, including "preventive, curative and palliative interventions (i.e. alleviates pain without curing), whether directed to individuals or to populations" (World Health Organization Report (2000) *Why do health systems matter?*). The organized provision of these goods and services create a health care delivery system.

According to Shi and Singh (2004), the two primary objectives of a health care delivery system are: (1) to enable all citizens to access health care services and (2) the services must be cost-effective and meet certain established standards of quality. A good health care delivery system should provide access to quality health services that ultimately improve health care outcomes. In *Medicine's Dilemmas: Infinite Needs versus Finite Resources*, Dr. Kissick suggests that cost containment, quality and access to care forms the "iron triangle" that shapes the utilization of health care resources. Dr. Kissick concludes that no country has enough resources to provide all the health services, at the highest level of care its population may ultimately require and, be able to pay for it (1994).

The Military Health System

The Military Health System (MHS) is the Department of Defense (DoD) primary health care delivery system for executing its medical mission of maintaining the health of active duty service members in peacetime and during military operations. The MHS also provides health

care to other individuals, including dependents of active duty members, military retirees, their dependents and survivors.

The MHS has more than 150,000 medical personnel, both military and civilian, providing medical services in combat theaters and in facilities worldwide. The MHS operates over 70 hospitals and 400 clinics around the world; conducts global aeromedical evacuation; shipboard and undersea medicine; and delivers humanitarian and other medical crisis response capabilities. The MHS provides access to medical care through its military hospitals and clinics, known as military treatment facilities (MTFs), and civilian medical providers. Medical services provided at the MTF include outpatient and inpatient care for medical and surgical conditions, pharmacy services, physical examinations, dental care, and diagnostic, laboratory and radiological tests and services. There are approximately 8.3 million individuals who are eligible to receive care through the MHS. For those that are eligible, they can receive medical care under a program known as TRICARE (Shi & Singh, 2004).

TRICARE provides medical care to eligible beneficiaries through a network of military and civilian care providers. The TRICARE program has three key features. First, TRICARE is regionally managed, which facilitates efficient administration of the program. Second, it is structured after a managed care model. Finally, TRICARE pools the medical resources of all the Armed Services and supplements them with networks of civilian health care providers.

Brooke Army Medical Center & Military Health Care in San Antonio, Texas

Brooke Army Medical Center (BAMC) is a 450 bed health care facility that provides level-one trauma and graduate medical education in San Antonio, Texas. BAMC also houses the Institute of Surgical Research, a tenant organization under their operational control, which has the distinction of being the only burn center in the DoD. BAMC operates in a Multi-Service

Market (MSM) where more than one branch of the armed services has an MTF present and significant beneficiary health care costs exists (TMA Governance Plan, 2003). The intent of the MSM is to improve efficiency by eliminating clinical redundancy and encouraging facilities to specialize in what they do best (Slackman, 1988). The San Antonio Multi-Service Market (SA-MSM) consists of BAMC, Wilford Hall Medical Center (WHMC), Randolph Clinic and Brooks Clinic. The ultimate goal of BAMC in the SA-MSM is to maximize utilization of its services within the direct care system and optimize efficiency between the direct (MTF) and purchased care markets (network) (TMA Governance Plan, 2003).

Mental Health Services at BAMC

The Department of Behavioral Medicine at BAMC provides behavioral health services, child and adolescent psychology services, community mental health services and psychiatry services. Beneficiaries receive outpatient treatment and consultation related to the management of psychological issues associated with medical treatment and disease management, with a focus on health maintenance and recovery. The range of conditions includes chronic illnesses (e.g. cancer), psychological pain management, modification of health risk behaviors, and rehabilitative counseling.

In order for a patient at BAMC to receive a mental health visit, they can self refer or be referred by their primary care manager (PCM) or physician. With a referral, the patient will be seen at the BAMC Behavioral Health Clinic, another MTF in SA-MSM or a local civilian provider in the network. The referral process is facilitated by the Consult and Appointment Management Office (CAMO) who accepts the consult generated by the PCM and forwards it electronically to the specialty clinic for review and acceptance. If the clinic accepts the referral, the CAMO, contacts the patient to schedule an appointment. If the clinic declines the referral, it

goes to another MTF in the SA-MSM that has the specialty being requested. SA-MSM attempts to maximize utilization within the direct care system first, however, if none of the MTFs within the SA-MSM are able to accept the referral, the CAMO will provide access to care by scheduling an appointment through the civilian network (purchased care system). The TRICARE benefit enables eligible DoD beneficiaries to overcome a significant barrier to healthcare found in the private sector, where over 40 million people have no health insurance (Shi & Singh, 2004). Although having health insurance (i.e. TRICARE) intuitively improves the likelihood of good health outcomes for service members and their families, it does not totally insulate them from risk factors like exposure to combat stress that may leave them more vulnerable to bad health outcomes (Hosek et al., 2006).

Conditions that Prompted the Study

Since September 11, 2001, military service members and their families have endured extremely stressful conditions, associated with the prolonged effects of combat operations in Iraq and Afghanistan, which are unparalleled in recent history. According to a 2007 Report by the American Psychological Association, over 1.5 million service members have been deployed in support of the Global War on Terror (GWOT), with one-third of them having served multiple combat tours. To date, more than 3,200 Americans deployed in support of GWOT have been killed and over 23,000 have returned home with physical injuries and a range of permanent disabilities; e.g., limb loss, burns and traumatic brain injury (APA Report, 2007). In addition to the physical wounds, many combat deployed forces experience multiple life-changing stressors that impact their ability to reintegrate with their families when they return home. Hoge et al. (2006) found that as many as one-fourth of all returning service members are struggling with less visible psychological injuries.

In May 2007, the Chief of Staff of the Army (CSA), General George Casey Jr., outlined his seven strategic priorities, one of which focused on greater support for the mental health and welfare of military families. BAMC currently receives all uniformed services burn patients (including those injured in combat) in the DoD and is one of the major stateside MTFs where service members evacuated from combat operations in Iraq and Afghanistan are sent to receive life-saving surgical and rehabilitative care. The unique challenge associated with military combat exposure creates the potential for greater mental health impairment among service members and their families (Hosek et al., 2006).

The rehabilitative care process for many injured veterans often involves treating combat or trauma related stress and its impact on their family members. At present, approximately 40% of the active duty licensed clinical psychologist positions in the Army and Navy are vacant (APA Report, 2007). The shortage of mental health personnel within the uniformed services, trained to address the deployment-related needs of military personnel and their families creates the potential for several negative outcomes including reduced access to care at the MTF and reduced quality of care from civilian providers not trained in the unique aspects of military life. In order to provide access to quality mental health services for our military personnel and families, to ensure a ready force, it is necessary to understand the factors that effect mental health care utilization so limited resources can be allocated efficiently.

BAMC, receives a large number of soldiers injured in Iraq or Afghanistan. In fact, this population has consistently averaged over 600 outpatients and inpatients for the past few years. The acuity of these patients range from less severe (e.g. bone fractures) to very severe (e.g. amputations and head injuries), but all of them represent a high risk population for emotional or mental health problems and will likely need mental health counseling.

Survival strategies, which are highly adaptive in a combat environment, are often disruptive to civilian life; interpersonal and family functioning is inevitably affected to some extent by combat exposure. Hoge, Castro, et al (2004) found a significant risk of mental health problems among members of the Army and Marine Corps returning from combat operations in Iraq and Afghanistan. There were also important barriers to receiving mental health services reported. Among the highest perceived barriers to seeking mental health services was difficulty in accessing an appointment. Almost one-half (45%) of the service members who screened positive for mental health problems felt it would be difficult to schedule an appointment. In many health care settings, wait lists result in delays that extend for weeks or even months and unfortunately, many of these delays result in people not obtaining treatment at all (Hoge et al., 2004). A recent Government Accounting Office (GAO) report concluded that only about 22% of those screened positive for post traumatic stress disorder (PTSD) actually received a referral to treatment (Hoge et al., 2004). Similarly in the Military Health System (MHS), only about 23% of the Iraq War veterans and only about 18% of the Afghanistan War veterans who screened positive for mental health concerns were actually referred for treatment (Hoge et al., 2006).

According to findings of a report released by the American Psychological Association (APA) Presidential Task Force on Military Deployment Services for Youth, Families and Services Members, many Iraq War veterans and their families are not getting the needed psychological help because the military's mental health system is overwhelmed and understaffed resulting in reduced access to care (APA Report, 2007). Therefore, a major potential problem faced by service members returning from a combat deployment is access to mental health services. BAMC cannot effectively support the MHS's mission of maintaining the health of

service members and their families if disparities or barriers in mental health services utilization exist.

Research Question

In response to these potential barriers to care for our service members, this study was conducted to analyze outpatient mental health services utilization in the BAMC Behavioral Health Clinic and those referred out to the civilian network. The most widely used model for studying health service utilization is the Andersen Behavioral Model (ABM) (Phillips et al., 1998). The model suggests that an individual's use of health services is a function of predisposing (demographic) enabling (socio-economic), and the need for care. The research question for this study is, what are the determinants of direct and purchased outpatient mental health services utilization at BAMC? The results section will discuss the factors that predict outpatient mental health utilization for BAMC and present a comparison between service members who have deployed to GWOT and the rest of beneficiary population. The paper concludes with a discussion on the finding, conclusions and recommendations for future research.

The purpose of this study is to identify the determinants of outpatient mental health services utilization at BAMC, within the framework of the ABM, and discuss recommendations for meeting the current and future demand for this critical service. One of the goals of this study is to identify inequities that hinder the use of mental health services for individuals at greater risk for poorer health outcomes (e.g. combat veterans). Another goal of this research is to contribute to the growing body of knowledge on factors that predict the use of mental health services by armed forces personnel who have participated in recent combat operations in support of the War on Terror. Answering the research question may help reduce the stigma surrounding

seeking mental health care among service members and eliminate some of the biases held regarding the causes of mental illness and treatments available.

Literature Review

This section reviews related literature that focuses on the predisposing, enabling, need factors, and other healthcare concepts that have been used in previous studies to predict health services utilization and apply them specifically to the use of mental health services. The purpose of this literature review is two-fold. The first section reviews the conceptual framework used by researchers to study health services utilization. The second section reviews the factors that have been shown to influence an individual's health services utilization behavior.

Conceptual framework.

To explore the determinants of mental health services utilization, the ABM was used. This model has been used extensively to study acute ambulatory use since the early 1970s (Henton et al., 2002). Previous research indicates that the model has been used to examine the determinants of health services utilization with physical health services (Coughlin, Long and Kendall, 2002; Goldberg et al., 2002; Weller et al., 2003), dental services (Andersen and Davidson, 1997), and mental health services (Portes, Kyle, and Eaton, 1992). Several variations of the ABM have also been used successfully in health service utilization studies among vulnerable populations (Bass et al., 1992; Wolinsky et al., 1983).

Central to the concepts in the ABM is the underlying idea that there are segments of the population that are more vulnerable along the healthcare continuum. According to Phillips (1992), the concept of "vulnerability" is the differential risk of poor physical, psychological, or social health. Certain groups of people in the United States have been commonly considered vulnerable to an increased risk of poor health (Leight, 2003). Women, children, ethnic people of

color and immigrants have been considered vulnerable to an increased risk of poor health outcomes (Ricketts, 1999). In 1998, Flaskerud & Winslow examined the probabilities of illness on social group having an increased susceptibility to adverse health outcomes. They conceptualized resource availability as both socioeconomic and environmental and suggested that there is a greater relative risk or ratio of poor health outcomes for people who lack resources than for those who have or receive resources. There are three key relationships that exist between the ABM and Phillip's concept of vulnerability that are important to understanding the conceptual model used in this study. These relationships integrate the ideas of relative health risk and the associated health behavior decision-making processes in a given population.

The first relationship exists between demographic elements and relative risks and suggests that barriers created due to factors such as ethnicity or distance to care can increase the risk of poor health outcomes. Predisposing factors in the ABM would consider variables such as age, ethnic behavioral norms, and combat experience on healthcare utilization. Hoge et al. (2004) found that the concern about the stigma of seeking mental health care by military personnel returning from combat was disproportionately greatest among those most in need of help. If combat experience increases the likelihood that people will defer healthcare, this may result in more severe health conditions when healthcare is finally sought.

The second proposition speaks to the relationship between relative risk and resource availability. The term relative risk reflects the differential vulnerability of some groups to poor health. The vulnerability hypothesis argues that negative or stressful life-events (such as combat or unemployment and the related loss of income or personal resources) hurt some people more than others (Aday, 1993). While the concept of risk assumes that there is always a chance that an adverse health related outcome may occur, people may be more or less at risk of poor health at

different times in their lives, and some individuals and groups are more at risk than others at any given point in time (Aday, 1993). The enabling factors in our expanded ABM frames the concept of relative risk in terms of access to care (availability of mental health providers) and resource availability in terms of economics (income based on military pay grade). Decreased levels of medical services (i.e. healthcare providers) in a region may further exacerbate access to healthcare in certain areas and increase the likelihood of added illness or poor health outcomes in a population group (Aday, 1994; Flaskerud, 1998; Phillips, 1992).

The final relationship exists between resource availability and demographic elements (Aday, 1993, 1994; Flaskerud & Winslow, 1998). The number of opportunities and the presence (or absence) of material and nonmaterial resources available to individuals vary as a function of the existing demographic arrangements. Thus illness in a vulnerable community or group, like returning combat veterans, may further deplete limited healthcare resources and thereby exacerbate the relative risk of poor physical, psychological, or social health of the community members (Aday, 1993, 1994; Flaskerud & Winslow, 1998; Phillips, 1992).

A modified version of the ABM used in this analysis integrated several aspects of Phillip's (1992) vulnerable population concept and the ABM to develop a framework for evaluating community versus individual use of healthcare services. Healthcare utilization behavior, in terms of the number of direct and purchased care outpatient mental health visits, is thought to be influenced by predisposing, enabling, and need healthcare inputs. The conceptual framework for understanding these determinants of healthcare utilization is based on the idea that the demographic make-up and the physical environment, economic factors, access to available providers in the healthcare delivery systems, and the presence or absence of perceived or evaluated health status influence healthcare utilization behaviors (Henton et al., 2002). The

goal was to help identify differences in the rates and types of mental health service resources consumed by vulnerable beneficiaries (e.g. those with recent combat experience).

Hoge, Castro, et al. (2004) observed a significant risk of mental health problems among Army soldiers returning home who were involved in combat operations in Iraq and Afghanistan. The study found that exposure to combat stress was significantly greater among those deployed to Iraq than to Afghanistan. Subjects were screened for mental disorders including: major depression, generalized anxiety, or PTSD. For the Soldiers that deployed to Iraq, 15.6 to 17.1 percent met the criteria for mental health disorders, while for those that deployed to Afghanistan, 11.2 percent met the criteria. Of those identified with mental disorders only 23 to 40 percent sought mental health care (Hoge, Castro, et al., 2004).

A study by Hoge, Auchterlonie, et al. (2006) later concluded that combat duty in Iraq was associated with high utilization of mental health services and attrition from the military after deployment. Likewise, Erbes, Westermeyer, et al. (2007) suggest that PTSD and alcohol related problems, from exposure to the stress of combat, are prevalent in service members returning from Iraq and Afghanistan and are associated with poor health outcomes and a lower quality of life. These vulnerable populations have an increased susceptibility to adverse health outcomes. For instance, Hosek et al. (2006) documented the psychological stressors associated with exposure to a combat zone and the duration of the deployment. They found that 11% to 18% of personnel exposed to combat experienced symptoms of increased stress reactions and mental disorders compared to 9% of those without combat experience. As the duration of the combat tour increased, so did the rate of adverse stress reactions. This data coincides with previous research showing that PTSD symptoms are more pronounced among personnel deployed for longer than four months (Adler & Castro, 2001). Evidence of this differential in vulnerability, or

increased risk, includes premature mortality, increased morbidity, decreased functional status, decreased access to care and diminished quality of life (Leight, 2003). Given the risks associated with the stress of exposure to combat injury or illness while deployed and the current operational tempo of the military, many service members and their families are more vulnerable to significant mental health problems and may utilize mental health services at a higher rate. The increased risks of bad health outcomes are associated with vulnerable populations and supported including these concepts in the conceptual framework for mental health services utilization.

Results from these studies conclude that the ABM and the concept of vulnerability are both useful in identifying the determinants of health services utilization. Using the ABM to evaluate these utilization factors as inputs can provide reliable estimates for mental health service demand and expenditures, mental health staffing levels, and optimization of direct and network care. Findings in the literature related to each population characteristic in the ABM are discussed below.

Factors influencing health services utilization.

The concepts from the ABM examined in this study were population characteristics (predisposing, enabling, and need factors) and health behavior (use of mental health services). Predisposing factors, representing the propensity of the person to use mental health services, are indicated by demographic variables. Enabling resources are supporting resources, which may be indicated by economic resource variables and community resource variables. Need factors represent the reason for seeking services and are indicated by perceived and evaluated need variables. Health behavior, the use of outpatient mental health services, is indicated by the number of outpatient mental health visits.

Predisposing characteristics have explained varying but lesser (10% or less) amounts of variance in health service use (Bass et al., 1992; Evashwick et al., 1984; Wolinsky & Johnson, 1991). Among the predisposing factors the strongest determinants of health service utilization have been age (Rabiner, 1995) and female gender (Solomon et al., 1993). Being unmarried (Mauser & Miller, 1994) and having less than a high school education have also been reported as important determinants (Solomon et al., 1993), but to a lesser extent than age and gender. The marriage variable was available in the direct care database but the information was not captured for purchased care visits so it could not be used. The race/ethnicity characteristic had no effect on the use of health services (Rabiner). However, Evashwick et al. found that Whites used significantly fewer health services, and Mauser and Miller reported that being non-White significantly increased the likelihood of using health services (Henton, et al., 2002). Since the race variable was only available for direct care outpatient encounters in M2, this variable was not used in the model. Additionally, Hoge et al., 2006 found that combat duty in Iraq was associated with high utilization of mental health services; therefore, combat service was used as a determinant of health service utilization as well.

Multiple studies have found that enabling resources did not account for significant amounts of variance in the use of health services (Bass et al., 1992; Branch et al., 1981; Coulton & Frost, 1982; Kempen & Suurmeijer, 1991; Wolinsky & Johnson, 1991). Two studies found that the personal resource of income was not related to health service utilization (Branch et al., 1981; Coulton & Frost, 1982), but Evashwick et al. (1984) reported that having a high income was related to more health service utilization. Some researchers have found that the availability of healthcare providers was a statistically significant predictor of health service utilization (Aday, 1993; Broyles et al., 1999; Larson and Fleishman, 2003) and others have obtained mixed

results. Due to the mixed results in previous studies, it was important to include some measure of the available resource in the community in this analysis.

Among the population characteristics, need characteristics are found to be the strongest determinants of health service utilization regardless of how service use was measured (Bass et al., 1992; Coulton & Frost, 1982; Evashwick et al., 1984; Wolinsky & Johnson, 1991). Need factors accounted for significant amounts of variance ranging from 12% to 15% (Bass et al., 1992; Evashwick et al., 1984; Wolinsky & Johnson, 1991) to 40% (Coulton & Frost, 1982; Kempen & Suurmeijer, 1991). Studies that used the Andersen model to group variables also reported that need variables were the strongest determinants of health service utilization (Dodge et al., 1999; Mauser & Miller, 1994). Among studies that have used Andersen's Behavioral Model to explain health service utilization, perceived need has been extensively examined. The two indicators of perceived need found to significantly explain the use of health services were poor perceived health status (Evashwick et al., 1984; Rabiner, 1995) and functional limitations (Bass et al., 1992; Rabiner). Boer et al. (1997) found that in seven of the nine studies they reviewed examining health status and physician visits, those who perceived their health status to be poor made more visits to the doctor's office. Perceived poor health status, in our model, is expressed as the number of cumulative days deployed to Iraq or Afghanistan and evaluated health by the mental health diagnosis indicated by the healthcare provider for the visit. Need based on health status are important variables to examine because one would expect those with poorer health to use medical services at a higher rate.

Conceptual Model

In the modified ABM shown in Figure 1, the conceptual model is presented with an increased focus on the effects of enabling factors (due to the shortage of uniformed behavioral

health professionals) and need factors (due to the potential decreased health status of service members who have been deployed) used in this study for systematic assessment of the differences in the factors influencing healthcare utilization. The model can be applied by policy analysis and health services managers to help describe, predict, and explain population healthcare utilization behaviors and service needs.

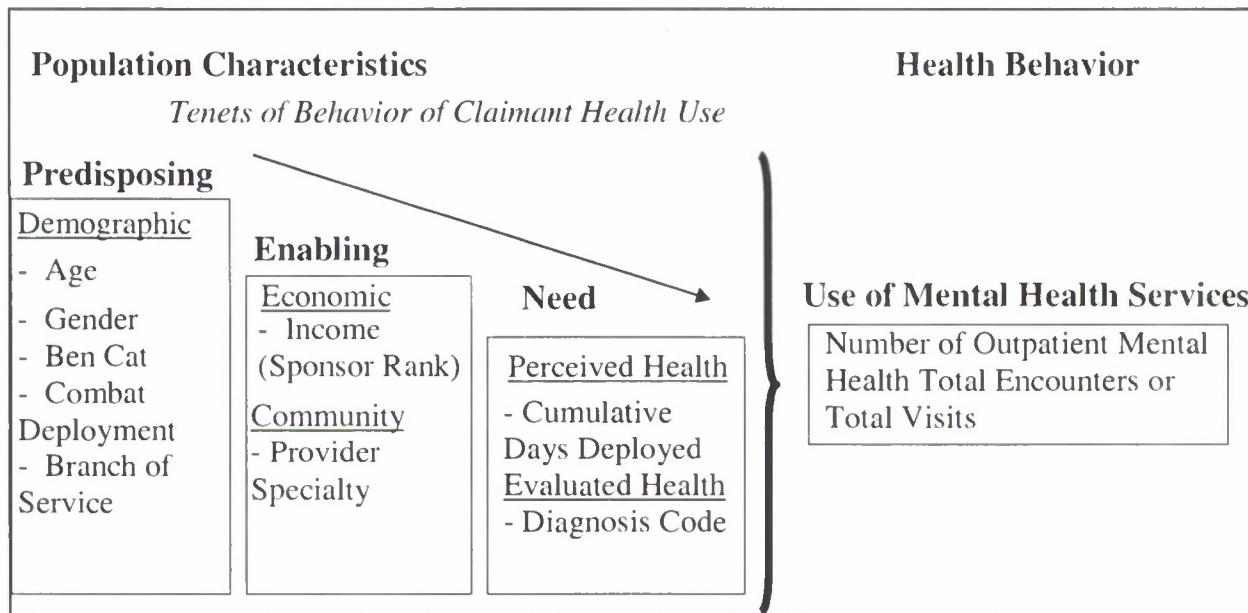


Figure 1. Determinants of Mental Health Services Utilization (selected concepts from Phillip's Vulnerability Concept [Phillip, 1992] and Andersen's Behavioral Model [Andersen, 1995]).

The unit of analysis or observations in this model is the number of mental health visits. The two equivalent dependent variables are “total encounters” and “total number of visits”. Total visits were chosen as the dependent variable to assess the demand for services and identify any mental health trends that might be a cause for concern. The model in Figure 1 describes direct outpatient care episodes as total encounters derived from an MTF clinic. Similarly, the model explains purchased outpatient care episodes as total visits or total number of visits expected, when all claims have been processed (M2 Data Dictionary, November 2007). Both measures

operationally defined mental health visits and help examine factors that impact outpatient mental health services in both the direct and purchased care systems.

Nine independent variables are examined in this model (See Figure 1). They are grouped into three distinct categories, predisposing (age, gender, beneficiary category or BENCAT, if the military sponsor had ever deployed to GWOT, and the military sponsor's branch of service), enabling (income indicated by the military sponsor's rank and available mental health provider specialty) and need (cumulative days deployed and primary diagnosis code or major reason for the healthcare visit indicated by the healthcare provider).

Predisposing Factors. Although it is widely believed that older persons use more health services than younger persons due to age-related illnesses, it is unclear whether the difference is statistically significant (Green and Pope, 1999; de Boer, Wijker, and de Haes, 1997). Age is predicted to have an effect on mental health service utilization, because approximately half of active duty service members are in the 18 to 24 year old age group (Bureau of Labor and Statistics, 2007). Gender is chosen as a predictor variable because the literature consistently shows that women are more sensitive to the symptoms of illness and utilize healthcare services at a higher rate than men (Narrow et al., 2000; Rieker and Bird, 2000; Verbrugge, 1990). Beneficiary category and branch of service may indicate more heavy users of health services in the population and whether the military sponsor has recent experience in a combat environment has been shown to significantly increase the risk of mental health problems and impact health service utilization behavior (Hoge et al., 2004; Hosek et al., 2006).

Enabling Factors. Income data is not available to make any direct comparison about socio-economic status in the population; therefore, the surrogate variable of "Sponsor Rank" is used because of its association with income ranges found on the military pay scale. Since

TRICARE is a health insurance benefit shared by all service members, rank or socio-economic status does not present the same barriers to healthcare access found in the general population (Shi & Singh, 2004). Instead, Sponsor Rank is used in this analysis as a crude indicator of increased social networks or more social ties that may indicate greater access to specialty care. Higher rank is expected to coincide with greater social networks and greater use of healthcare.

Presently, approximately 40% of the active duty licensed clinical psychologist billets in the Army and Navy are vacant (APA Report, 2007). Personnel shortages have led to an increase in behavioral health providers deployed forward to support combat forces and a decrease in the number of uniformed psychologist available to care for service members who have returned from deployment and their families. Due to the mixed results of previous studies on the impact of available providers on the use of health services, the community variable (provider specialty) was an important factor to evaluate because it addresses the availability mental health providers to facilitate access to care (Aday, 1993; Broyles et al., 1999; Larson and Fleishman, 2003).

Need Factors. Cumulative days deployed is a perceived health status variable used to examine whether length of exposure to a combat environment was a significant predictor of mental health service utilization. Hosek et al. (2006) found that as the duration of the combat tour increased, the rate of adverse stress reactions increased. A previous study by Adler & Castro, 2001 also showed that PTSD symptoms were more pronounced among personnel deployed for longer than four months.

Mental health diagnosis is an evaluated health status variable used to evaluate whether certain mental health conditions resulted in higher utilization of health services. An electronic record is generated for all ambulatory visits at BAMC and includes date of visit; clinic type; and diagnoses coded using the *International Classification of Diseases, Ninth Revision, Clinical*

Modification (ICD-9-CM). Mental health care diagnostic categories are analyzed based on the primary diagnosis coded using *ICD-9* codes and type of service, with mental health services defined as psychiatry, psychology, social work, alcohol or substance abuse, and multidisciplinary community mental health clinics. A health care visit for a mental health problem was operationally defined as any visit during which a primary or secondary mental disorder diagnosis (*ICD-9-CM* category 290-319) was used or an *ICD-9-CMV* code was assigned that indicated treatment for a mental health problem.

Methods and Procedures

Data Source

The data for the study came from the Military Health System Data Mart (M2) and covered fiscal years 2005-2007. The panel data provided an appropriate time period for analysis and a sufficient confidence level to support using the results for decision-making. The M2 database is a widely accepted source of high quality data and is used extensively to support research and decision-making in the MHS. M2 is used to obtain summary and detail views of population, clinical, and financial data. The system provides data on MTF (direct) and civilian network claims that are integrated with eligibility and enrollment data. This integrated data enhances support to health care managers across the MHS by enabling them to perform trend analysis, conduct patient and provider profiling studies, and conduct business case analysis to maximize health plan efficiency.

The BAMC Behavioral Health Clinic outpatient visits from fiscal years 2005 through 2007 were extracted from M2. No personally identifiable information was used in this analysis and the confidentiality of the beneficiary was preserved at all times. Additionally, there was no

access to Protected Health Information (PHI) and therefore approval for the research was not required by the BAMC Institutional Review Board.

The complete data set consists of 33,860 direct outpatient mental health encounters or observations and 27,300 purchased care visits. The data was analyzed using the Statistical Package for the Social Sciences (SPSS) 12.0 for Windows software. The sample included all direct and purchased care outpatient mental health visits captured under the Treatment DMIS ID for BAMC from 2005 to 2007.¹ The data were cleaned to eliminate observations with missing data. Appendices B and C show the steps used to create the final analytic files for direct and purchased care visits and the resulting sample sizes.

Research Design

The analysis was conducted using hierarchical multiple regression to test the hypothesis that predisposing, enabling, and need factors each make a unique contribution in explaining the variance in the number of outpatient mental health visits. This analysis involved comparing a full regression model showing all of the variance accounted for by all the predictors combined with several reduced models that estimated the incremental change in variance that occurred when each predictor was removed from the regression equation while holding all others constant. The difference in variance from the full and reduced models was seen as variance uniquely attributed to a given predictor. Additionally, descriptive statistics were analyzed for utilization trends and beta coefficients were calculated to determine the direction and magnitude of functional relationships among the variables. The higher the beta between the number of visits (dependent variable) and the predictor (independent variable), the more likely the predictors were to have a significant impact on utilization behavior. Positive beta coefficients indicated the likelihood for a visit was greater than the average and the opposite was true for negative correlations. In order to

¹ A code in M2 that identifies the MTF responsible for the treatment of the patient during the episode of care.

avoid Type I errors (rejecting null when it is true) and Type II errors (accepting the null when it is false), an alpha level of $p < 0.05$ was chosen for this study and is consistent with previous research. The p values less than 0.05, represent correlation coefficients that are statistically significant in the model.

Hypothesis Statements

The two central hypotheses tested are that direct and purchased care outpatient mental health service utilization vary as a function of predisposing, enabling, and need factors (H_a or $H_b : \beta_1 \neq \beta_2 \neq \beta_3$), where H_a = direct care visits, H_b = purchased care visits, β_1 = Predisposing factors (age, gender, beneficiary category, GWOT deployment and branch of service), β_2 = Enabling factors (sponsor rank group and access to available provider specialty) and β_3 = Need factors (cumulative GWOT days deployed and mental health diagnosis code). The null hypotheses state that no statistically significant difference exists and all variables predict direct and purchased care mental health services utilization equally ($H_0: \beta_1 = \beta_2 = \beta_3$). This research will examine the following hypotheses:

H_{a1} : The predisposing variables (age, gender, beneficiary category, GWOT deployment and branch of service) positively impact direct care outpatient mental service utilization for service members and their families.

H_{a2} : The enabling variables (sponsor rank group and access to available provider specialty) positively impact direct care outpatient mental health service utilization for service members and their families.

H_{a3} : The need factors (cumulative GWOT days deployed and mental health diagnosis code) positively impact direct care outpatient mental health service utilization by service members and their families.

H_{b1} : The predisposing variables (age, gender, beneficiary category, GWOT deployment and branch of service) positively impact purchased care outpatient mental service utilization for service members and their families.

H_{b2} : The enabling variables (sponsor rank group and access to available provider specialty) positively impact purchased care outpatient mental health service utilization for service members and their families.

H_{b3} : The need factors (cumulative GWOT days deployed and mental health diagnosis code) positively impact purchased care outpatient mental health service utilization by service members and their families.

Results

Data Analysis

The two dependent variables used in this study (number of direct care outpatient visits and the number of purchased care outpatient visits) and the associated predictor variables (predisposing, enabling and need factors) were chosen because of their relevance in examining the effects of beneficiary or patient disposition and behavior on healthcare utilization. The results of the analyses are presented in two sections. The first section includes the sample characteristics of the population for all variables included in the analysis for both direct and purchased care visits. These visits were subsequently assigned to one of two groups; visits where the military sponsor was identified as having a deployment to GWOT and those where they did not in order to observe the effects of combat exposure on utilization of mental health services. The second section provides the results of the hierarchical regression analyses and determines if there are statistically significant differences in the determinants of outpatient mental health service

utilization between GWOT veterans and their family members and the rest of the beneficiary population.

Sample Characteristics

The descriptive statistics including frequency distributions for the predisposing characteristics, enabling resources, and need characteristics were calculated for direct care visits (Appendix D) and purchased care visits (Appendix E). The predisposing characteristics for direct care outpatient mental health visits indicate a mean age within the sample of 31 years old (32 for military sponsors who have deployed), about 2/3 were male (67%) with over 36% of the total sample having deployed in support of the War on Terror. Greater than 3/4 of the deployed sponsors (83%) are male. Approximately 87% of the visits were by active duty service members and 92% of them were in the Army. The enabling resources indicate the majority of the sample has an enlisted sponsor (91%) and the service or family member saw either a Psychiatrist (34%) or a Psychologist (35%) during their visit. Finally, the need characteristics for outpatient mental health visits at BAMC show the average service member with combat experience had 106 cumulative days deployed in a combat zone. A mental health diagnosis for PTSD, for an episode of care, was almost 10 times greater for visits where the sponsor in the sample had deployed to GWOT (29%) than when they had not (3%). There was essentially no difference in our dependent variable, the mean number of outpatient mental health visits, for those with a sponsor who deployed to GWOT (1.24) and those who had not deployed (1.23).

For the predisposing characteristics for purchased care outpatient mental health visits referred out to the network by BAMC for the sample, the mean age within the sample was 32 years old for those whose sponsor did not deployed to GWOT and 34 for military sponsors who have deployed. About 2/3 were female in this sample (63%) with about 1% of the total sample

having deployed in support of the War on Terror. Approximately 2/3 of the deployed sponsors (62%) were identified as male. About 87% of the visits were by active duty service members with about 2/3 of them being in the Army (63%) and roughly 1/3 being in the Air Force (30%). An evaluation of the enabling resources for purchased care visits indicate that the sponsors were about 2/3 senior enlisted members (60%) and senior officers (27%) and them or a family member saw either a Psychiatrist (44%), a Psychologist (20%), or a Certified Clinical Social Worker (27%) during their visit. The need characteristics for purchased care outpatient mental health visits at BAMC show the average service member with combat experience had 265 cumulative days deployed in a combat zone. A mental health diagnosis for post-traumatic stress disorder (PTSD) in this sample, for an episode of care, was more than six times greater for visits where the sponsor in the sample had deployed to GWOT (16%) than when they had not (2.5%). In the purchased care sample, there was a slightly higher rate of outpatient mental health utilization for those with a sponsor who deployed to GWOT (1.91 visits) as opposed to those who did not (1.60 visits).

Hierarchical Regression Analyses

The results of several hierarchical multiple regression analyses for the utilization of outpatient mental health services are shown in Appendices F, G, H, and I. Four models were analyzed to identify the determinants of outpatient mental health visits for direct and purchased care and compared two groups, those where the military sponsor previously deployed and those where they did not.

Direct care visits where the sponsor deployed (Appendix F): predisposing characteristics explained less than 1% of the variance, enabling resources explained about 7%, and need characteristics accounted for less than 1% of the shared variance in the number of outpatient

mental health visits. Two predisposing factors, being in the Army ($\beta = -.021$) or the Navy ($\beta = .026$); three enabling factors, seeing a Psychiatrist ($\beta = -.092$), an Alcohol or Drug Abuse Counselor ($\beta = .215$), or a Mental Health Technician ($\beta = -.063$) during the visit; and three need factors, having a diagnosis of PTSD ($\beta = .045$), Acute Stress Reaction ($\beta = .023$), or Other mental health problem ($\beta = -.028$), independently contributed to the amount of explained variance in the number of direct care outpatient mental health visits where the sponsor previously deployed in support of the War on Terror. The adjusted R^2 for the total model indicated that 7% of the variance was uniquely explained by the predictor variables above.

Direct care visits where the sponsor did not deploy (Appendix G): predisposing characteristics also explained less than 1% of the variance, enabling resources explained about 6%, and need characteristics accounted for less than 1% of the shared variance in the number of outpatient mental health visits. Only one predisposing factor, being in the Army ($\beta = -.023$); five enabling factors, seeing a Psychiatrist ($\beta = -.105$), a Psychologist ($\beta = .034$), a Clinical or Psychiatric Nurse ($\beta = .089$), an Alcohol or Drug Abuse Counselor ($\beta = .271$), or a Mental Health Technician ($\beta = .045$) during a visit; and two need factors, having a diagnosis of PTSD ($\beta = .016$) or Concussion Syndrome ($\beta = .023$), independently contributed to the amount of explained variance in the number of direct care outpatient mental health visits where the sponsor did not previously deployed in support of the Global War on Terror. The adjusted R^2 for the total model indicated that 7% of the variance was uniquely explained by the predictor variables listed above.

Results of the regression analysis of the purchased care visits where the sponsor deployed (Appendix H): predisposing characteristics explained about 13% of the variance, enabling resources explained about 7%, and need characteristics did not explain additional variance in the

number of outpatient mental health visits purchased from the network. Four predisposing factors, being in the Marines ($\beta = .139$) or the Navy ($\beta = -.141$) service component or being in the Retired ($\beta = -.269$) or Retired Dependent ($\beta = -.216$) beneficiary category and two enabling factors, seeing a Psychiatrist ($\beta = -.222$) or a Certified Clinical Social Worker ($\beta = .253$), independently contributed to the amount of explained variance in the number of purchased care outpatient mental health visits where the sponsor was flagged for a previous deployment in support of GWOT in the M2 database. The adjusted R^2 for the total model indicated that 16% of the variance was uniquely explained by the predictor variables listed above.

Results of the regression analysis of the purchased care visits where the sponsor did not deploy in support of the War on Terror (Appendix I): predisposing characteristics explained about 1% of the variance, enabling resources explained about 9%, and need characteristics accounted for less than 1% of the shared variance in the number of outpatient mental health visits purchased from the network. Six predisposing factors, being male ($\beta = -.042$), in the Active Duty Dependent ($\beta = .047$), Retired ($\beta = .023$), Retired Dependent ($\beta = .257$) or Active Duty ($\beta = .049$) beneficiary categories, in the Coast Guard ($\beta = .012$); eight enabling factors, being Junior Enlisted ($\beta = .016$), Senior Enlisted ($\beta = -.019$), a Junior Officer ($\beta = -.012$), seeing a Psychiatrist ($\beta = -.301$), a Psychologist ($\beta = .257$), a Certified Clinical Social Worker ($\beta = .282$), a Mental Health Counselor ($\beta = .153$), or a Certified Marriage and Family Counselor ($\beta = .029$) during a visit; and three need factors, having a diagnosis of Adjustment Disorder ($\beta = .007$), Concussion Syndrome ($\beta = -.025$), or Depression ($\beta = -.031$); independently contributed to the amount of explained variance in the number of purchased care outpatient mental health visits where the sponsor did not previous deploy in support of GWOT. The adjusted R^2 for the total model

indicated that 10% of the variance was uniquely explained by the predictor variables listed above.

The direct and purchased care populations and the deployed and non-deployed groups have similar results for the predisposing characteristics. In each instant, the regression analysis found that predisposing factors were significant predictors of mental health service utilization ($p < .001$, except direct care visits where the sponsor deployed, then $p < .01$). The explained variance was about 1% each model except purchased care visits where the sponsor previously deployed to GWOT (13%). Similarly, enabling resources were a consistent predictor in both populations and the subgroups ($p < .001$, except purchased care visits where the sponsor deployed, then $p < .01$), accounting for about 6-9% of the explained variance. Need factors were the only predictors that were not statistically significant in both populations and the deployed and non-deployed groups. Need factors were not a predictor of purchased care outpatient mental health visits where the sponsor previously deployed to Iraq or Afghanistan in support of the War on Terror (Appendix H). In all other models, Appendices F, G, and I, need characteristics were significant at $p < .001$ and accounted for about 1% of the explained variance.

Discussion

The findings of this study provide information about the use of outpatient mental health services in the direct and purchased care networks, using the total number of visits as a measure of volume. As discussed in the review of the related literature, previous studies have identified predisposing, enabling and need factors, as correlates of health services utilization. Even when a significant barrier to healthcare is overcome by having health insurance, it does not necessarily mean that a vulnerable person will access healthcare. It is important to understand the predisposing, enabling and need factors that influence or explain any difference in individual

access to care and the use of healthcare. The results of this research provide some evidence that predisposing, enabling, and need factors used to examine health service or physician use in the general population are also sufficient to identify determinants of health service utilization in a closed healthcare system like the military health system.

Predisposing Characteristics

The alternate hypotheses H_{a1} (direct care) and H_{b1} (purchased care) proposed that predisposing variables, including age, gender, beneficiary category, GWOT deployment experience and branch of service, will have a positive impact on the use of outpatient mental health services. Only two predisposing variables are statistically significant determinants for the use of outpatient mental health service in both direct and purchased care, beneficiary category and branch of service, which suggests that these hypotheses are only partially supported. Being in the Army was positively associated with direct care visits which is what one would expect since BAMC is an Army MTF. Being retired or a retired dependent was positively associated with the use of purchased care, which is consistent with current policy at BAMC that prioritizes care to active duty and family members. Gender was only a significant predictor in the use of purchased care, where being male was associated with greater health service utilization. In previous studies, predisposing characteristics explained varying but lesser (10% or less) amounts of variance in the use of health services (Bass et al., 1992; Evashwick et al., 1984; Wolinsky & Johnson, 1991). The selected variables in this study consistently explained about 1% of the variance in health service utilization in direct care settings and up to 13% in purchased care settings. Although age was found to be a significant predictor in previous studies, it was not in this analysis and may be the result of a relatively young and healthy active duty population (Green and Pope, 1999; Goodwin and Andersen, 2002). Although Hoge et al. (2006) found that

combat duty in Iraq was associated with higher utilization of mental health services, GWOT deployment experience was not a significant predictor of greater mental health service utilization. The perception of stigma around seeking mental health services may be causing individuals most in need to defer care (Hoge et al., 2004).

Enabling Resources

The alternate hypotheses H_{a2} (direct care) and H_{b2} (purchased care) proposed that there is a positive relationship between enabling resources, sponsor rank group and access to available mental health providers, and use of outpatient mental health services for service members and their families. The available provider specialty was a significant predictor of mental health service utilization with all specialty types being significant. As indicated by the large β coefficients and F values listed for each model, the provider specialty type was the most important predictor variable contributing to the R^2 change and subsequently accounted for most of the explained variance in each model. Additionally, the frequency distributions for direct care and purchased care show that 69% and 64% of the visits respectively were with a Psychiatrist or a Psychologist. With approximately two-thirds of all visits being with a Psychiatrist or Psychologist and the reported vacancy of nearly 40% of the active duty licensed clinical psychologist positions in the Army and Navy, it makes it difficult for MTFs to meet the critical demand for mental health services (APA, 2007). The sponsor rank group was only a predictor of health service utilization in the purchased care sample for visits where the sponsor did not deploy. Again, this suggests that the hypotheses for enabling resources are only partially supported. Multiple studies have found that enabling resources did not account for significant amounts of variance in the use of health services (Bass et al., 1992; Branch et al., 1981; Coulton & Frost, 1982; Kempen & Suurmeijer, 1991; Wolinsky & Johnson, 1991). In this study, enabling

resources accounted for the largest amount of the explained or shared variance in the model. Two studies found that the personal resource of income was not related to health service utilization (Branch et al., 1981; Coulton & Frost, 1982), but Evashwick et al. (1984) reported that having a high income was related to more health service utilization. The higher the rank, the higher the income, which may result in a greater social network, but it is not an indicator of more or less healthcare utilization in this study. This study supports the findings of some researchers that the availability of healthcare providers is a statistically significant predictor of health service utilization (Aday, 1993; Broyles et al., 1999; Larson and Fleishman, 2003). Enabling resources, and particularly provider specialty, was the most significant predictor of health service utilization in this analysis, which is contrary to findings in previous studies (Bass et al., 1992). Perhaps enabling resources are more important in a closed healthcare system, like the military health system, where many access to care barriers found in the private sector are not as pervasive.

Need Characteristics

The alternate hypotheses H_{a3} (direct care) and H_{b3} (purchased care) proposed that there is a positive relationship between need factors, cumulative GWOT days deployed and mental health diagnosis code, and outpatient mental health service utilization by service members and their families. In previous studies using the Andersen Behavior Model, need variables were the strongest determinants of health service utilization (Dodge et al., 1999; Mauser & Miller, 1994). Need factors accounted for variance ranging from 12% to 15% (Bass et al., 1992; Evashwick et al., 1984; Wolinsky & Johnson, 1991) to 40% (Coulton & Frost, 1982; Kempen & Suurmeijer, 1991). In this study, need characteristics only accounted for about 1% of the explained variance. Need factors were a significant predictor of direct care mental health utilization ($p < .001$) but did not explain additional variance in purchased care outpatient mental health visits. Contrary to

previous studies, there was no significant relationship between the cumulative days the sponsor was deployed and higher health service utilization (Hosek et al., 2006). However, under the evaluated need variable, health diagnosis, PTSD was a significant predictor of direct care mental health visits and much higher among sponsors who deployed. Acute Stress, Depression, and Concussion Syndrome diagnoses were all found to be statistically significant predictors among direct care visits. While these findings are important, they suggest only partial support for the hypotheses.

Need factors are considered the most critical variables in the Andersen Behavior Model, because they focus on the perceived or evaluated need of the individual (Andersen, 1968, 1995). For example, one may suspect that they are ill, but the perceived illness is not evaluated as such until they visit a physician who either confirms or denies their assumption with a diagnosis. Need factors focus on having access to the appropriate resources to address health concerns that arise. The evidence of equity in the use of health care services is supported if those who need care are able to receive it. However, according to Aday and Andersen, inequities exist when the most significant predictors of health service utilization are found primarily among predisposing characteristics and enabling resources, as is the case in this study (Aday, 1993; Andersen, 1968, 1995; Gelberg et al., 2000). Although further analysis would be required to determine if the groups like those with deployment experience have needs for mental health services that have not been met, using the perceived health variable (cumulative days deployed) and the evaluated health variable (diagnosis code) as a proxy for need, the results of this study seem to support the premise that those in need of services may not be receiving them. The enabling resources indicated that provider specialty was a significant predictor in the use of mental health services,

so the mental health resources are available, but are they accessible to those who need them most?

Limitations of the Study

This study only examined the use of outpatient mental health services at BAMC. Perhaps a comparative analysis with a military treatment facility of similar size or a comparison of mental health service utilization trends in the DoD might have provided results that could be generalized across the military health system. The study is based primarily on secondary data that provides a retrospective look at mental health service utilization. The analyses are also constrained by limitations to the variables found in the M2 database. For example, marital status could not be included in the analyses as a predisposing factor, because the variable was not available in the outpatient purchased care dataset. Income could not be used as an enabling variable because that information is unavailable in the dataset. Similarly, it was not possible to use other health insurance as an enabling resource variable, because it was available in the direct care but not the purchased care dataset. Another potential limitation is that active duty service members may elect to pay for purchased care mental health services out of pocket to avoid the stigma around seeking mental health treatment in the military and fear that their careers will be negatively impacted if leadership knew they were having mental health problems.

Although the sample is representative of the military health system population, the Analysis File Creation for Direct Care and Purchased Care (Appendices B and C), show that a significant number of observations had to be deleted due to missing or incomplete data. Therefore, it is difficult to assess how those missing cases may have impacted the results of the study. Even if the remaining observations are representative of the sample population, the results might not be generalized to the population of the military health system due to the missing data.

Recommendations

The rate of PTSD diagnoses for visits where the sponsor previously deployed was 10 times greater for direct care visits and six times greater for purchased care visits compared to those who had not deployed. This study looked purely at the total number of visits over a three year time period and not the number of individuals seen. One individual may have used several mental health visits under the same diagnosis and each was counted as an observation. Further analysis should be done on PTSD and other significant predictors like acute stress and depression, to identify the most common mental health diagnosis among service members with combat experience and insure the proper provider mix exists to meet their needs.

The Andersen Behavioral Model, primarily used to explain the variation in the use of health services in the private health sector, may be useful in the military health system as well. This study has identified several factors that significantly contribute to health service utilization behavior. The statistically significant variables like gender, branch of service, provider specialty, and treatment diagnosis code could be analyzed using additional predisposing, enabling and need variables relevant to the military health system's beneficiary population to identify stronger determinants of health service utilization. This model may also inform healthcare providers and help shape resource decisions to develop or maintain sufficient mental health services at BAMC to meet the needs of the growing number of service members, their families and other beneficiary categories.

Further research is recommended to study the mental health needs of a vulnerable population like the military and the impact of long family separations and exposure to combat on utilization of health services over time. Although cumulative days deployed was not a significant predictor of the use of health services in this study, research suggests that the cumulative effects

of combat exposure result in poorer health outcomes over time (Hosek et al., 2006). If mental health service utilization varies as a function of predisposing, enabling and need factors in a military health system, it may point to inequities in the allocation of healthcare resources that should be addressed through policy or process changes.

Conclusion

The results of this study indicate that predisposing and enabling factors are significant predictors of direct and purchased care outpatient mental health services utilization among service members and their families. Predisposing variables like gender, branch of service, and beneficiary category were all positively associated with mental health services utilization. The enabling factor provider specialty was the most significant predictor of the use of health services with over two-thirds of all visits being with a Psychiatrist or a Clinical Psychologist. With shortages in mental health providers Army-wide, staffing, recruitment and retention of these critical specialty during a time of war is essential. The Army Surgeon General's Office recently announced a plan to hire at least 25 percent more psychiatrists, psychologists and social workers to address the large number of soldiers returning from war with mental problems. Approximately \$33 million has been allocated to add about 200 mental health professionals to help soldiers with PTSD and other mental health needs.

Although need factors were not a significant predictor of outpatient mental health service utilization in this study, several variables including a diagnosis for PTSD, acute stress, and depression were significant and should be evaluated more closely to determine if a service members are at risk for poorer health outcomes. Visits with a primary or secondary diagnosis for PTSD, by the health care provider, were nearly 10 times greater for a direct care visit and six times greater for a purchased care visit when the sponsor had previously deployed. Further

analysis should be conducted to identify if a significant number of service members in the BAMC beneficiary population are suffering from PTSD or are multiple visits being consumed by a relatively small number of service members.

Models such as the Andersen Behavioral Model, used with an enterprise wide military health system database like M2, provides a means for healthcare leaders to explore the determinants of health service utilization in the population and design healthcare strategies that will maintain the readiness of our armed forces and sustain the health and quality of life for service members and their families.

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Appendix A

Variable Code Sheet for Mental Health Services Utilization

Dependent Variables	Operationalized Measures	Variable Type and SPSS Data Codes
Total Encounters	Total # direct care outpatient mental health visits	Continuous
Total Number of Visits	Total # purchased care outpatient mental health visits	Continuous
Independent Variables	Operationalized Measures	Variable Type and SPSS Data Codes
Gender (GENDER)	Male or Female	1=male, 0=female
Age (AGE)	In years	Continuous
Ever Deployed to GWOT	Military Sponsor Deployed to Iraq or Afghanistan in support of the Global War on Terror	1=yes, 0=otherwise
Beneficiary Category	Active Duty or Retired and dependents	
Active Duty Dependent		1 = Active Duty Dependent 0 = Otherwise
Retired		1 = Retired 0 = Otherwise
Retired Dependent		1 = Retired Dependent 0 = Otherwise
Active Duty		1 = Active Duty 0 = Otherwise
Sponsor Service Component	The military sponsor's branch of service	
Army		1 = Army 0 = Otherwise
Air Force		1 = Air Force 0 = Otherwise
Marines		1 = Marines 0 = Otherwise
Navy		1 = Navy 0 = Otherwise
Coast Guard		1 = Coast Guard 0 = Otherwise
Sponsor Rank Group	The sponsor's rank reflects the income on the military pay scale. Junior Enlisted represents the lower end of the pay scale, whereas, Senior Officers represent the high end.	

E1-E4 – Junior Enlisted		1 = Junior Enlisted 0 = Otherwise
E5-E9 – Senior Enlisted		1 = Senior Enlisted 0 = Otherwise
WO1-WO5 – Warrant Officer		1 = Warrant Officer 0 = Otherwise
O1-O3 – Junior Officer		1 = Junior Officer 0 = Otherwise
O4-O10 – Senior Officer		1 = Senior Officer 0 = Otherwise
Provider Specialty Codes (Direct Care)	Identifies major specialty of the mental health provider seen at the direct care visit	
Psychiatry		1 = Psychiatry 0 = Otherwise
Psychology, Clinical or Social Work		1 = Psychology 0 = Otherwise
Nurse, General, Psychiatric, Clinical or Nurse Practitioner,		1 = Nurse 0 = Otherwise
Alcohol or Drug Abuse Counselor		1 = Alcohol or Drug Abuse Counselor 0 = Otherwise
Occupational Therapy		1 = Occupational Therapy 0 = Otherwise
Mental Health Technician		1 = Mental Health Technician 0 = Otherwise
Provider Specialty Codes (Purchased Care)	Identifies major specialty of the mental health provider seen at the purchased care visit	
Psychiatry		1 = Psychiatry 0 = Otherwise
Psychology, Clinical		1 = Psychology 0 = Otherwise
Certified Clinical Social Work,		1 = Clinical Social Work 0 = Otherwise
Mental Health Counselor,		1 = Mental Health Counselor 0 = Otherwise
Certified Marriage and Family Therapist		1 = Marriage & Family Therapist 0 = Otherwise
Cumulative GWOT Days Deployed	Length of time in days that the military sponsor has been deployed for GWOT	Continuous

Mental Health Diagnosis	Primary or secondary ICD-9-CM diagnosis code. ICD-9 codes 290 through 319 cover the range of Mental disorders. Encounters or visits were selected where a primary or secondary mental disorder code was indicated by the healthcare provider.	
Post-traumatic Stress Disorder (PTSD)	ICD-9 code 309.81	1 = PTSD 0 = Otherwise
Acute Stress	ICD-9 code 308.3	1 = Acute Stress 0 = Otherwise
Alcohol or Drug Abuse	ICD-9 codes 303 to 305.90	1 = Alcohol or Drug Abuse 0 = Otherwise
Adjustment Disorder, depressive	ICD-9 codes 309 to 309.28	1 = Adjustment Disorder 0 = Otherwise
Concussion Syndrome	ICD-9 code 310	1 = Concussion Syndrome 0 = Otherwise
Depression	ICD-9 code 311	1 = Depression 0 = Otherwise
Other Mental Health Disorders	All other ICD-9 codes in the range 290-319 except those previous listed	1 = Other Mental Health Disorders 0 = Otherwise

Appendix B

Analysis File Creation for Direct Care Visits from M2 Database

Sample Size	Action	Final Sample Size
65,536 encounters	Deleted 8,359 cases with the independent variable, primary or secondary diagnosis missing.	51,177 encounters
51,536 encounters	Deleted 23,289 cases with over half of the data missing.	33,888 outpatient encounters
33,888 encounters	Deleted 28 cases with the dependent variable, number of encounters missing.	33,860 outpatient encounters

Appendix C

Analysis File Creation for Purchased Care Visits from M2 Database

Sample Size	Action	Final Sample Size
27,322 visits	Deleted 3 cases with the independent variable primary or secondary diagnosis missing	27,319 encounters
27,319 encounters	Deleted 14 cases with over half the data missing	27,305 outpatient visits
27,305 encounters	Deleted 5 cases with the dependent variable number of visits missing	27,300 outpatient visits

Appendix D
Characteristics of the Direct Care Study Sample

Variable	Mean (SD)	Total Sample (%)	Sponsor has Not deployed (%)	Sponsor has Deployed (%)
Sample size		33,860 (100)	21,783 (64)	12,077 (36)
Dependent:				
Encounters				
Non-Deployed	1.23 (.65)			
Deployed	1.24 (.70)			
Predictors:				
Predisposing				
Age				
Non-Deployed	30.88 (13.47)			
Deployed	31.71 (8.87)			
Gender				
Male		22,816 (67)	12,773 (59)	10,043 (83)
Female		11,044 (33)	9,010 (41)	2,034 (17)
Beneficiary Category				
Active Duty Dependent	62 (.4)		55 (.3)	7 (.1)
Retired	3,763 (11)		3,433 (15.8)	330 (2.7)
Retired Dependent	530 (1.6)		255 (1.2)	275 (2.3)
Active Duty	29,505 (87)		18,040 (82.8)	11,465 (94.9)
Service Component				
Army	31,146 (92)		20,094 (92)	11,052 (92)
Air Force	1,211 (3.6)		1,058 (5)	153 (1)
Marines	855 (2.5)		170 (1)	685 (6)
Navy	626 (1.8)		439 (2)	187 (1)
Coast Guard	22 (.01)		22 (1)	0 (0)
Enabling				
Sponsor Rank Group				
E1-E4 - Jr. Enlisted	19,128 (57)		14,267 (65.5)	4,861 (40.3)
E5-E9 - Sr. Enlisted	11,363 (34)		5,429 (24.9)	5,934 (49.1)
Warrant Officer	164 (1)		127 (.6)	37 (.3)
O1-O3 - Jr. Officer	1,478 (4)		707 (3.2)	771 (6.4)
O4-O10 - Sr. Officer	1,727 (5)		1,253 (5.8)	474 (3.9)
Provider Specialty				
Psychiatry	11,414 (34)		7,416 (34)	3,998 (33)
Psychology	11,986 (35)		7,391 (34)	4,595 (38)
Alcohol or Drug				
Abuse Counselor	3,029 (9)		1,996 (9)	1,038 (9)
Nurse	3,317 (9.8)		1,576 (7)	1,741 (14)
Occupational Therapy	63 (.2)		14 (1)	49 (1)
Mental Health Tech	4,051 (12)		3,390 (15)	661 (5)

(continued)

Appendix D

Characteristics of the Direct Care Study Sample (continued)

Variable	Mean (SD)	Total Sample (%)	Sponsor has Not deployed (%)	Sponsor has Deployed (%)
Need				
Cumulative Days Deployed	106.25 (178.60)			
Mental Health Diagnosis				
PTSD	4,146 (12)	645 (3)	3,501 (29)	
Acute Stress Reaction	1,237 (4)	492 (2)	745 (6)	
Alcohol or Drug Abuse	4,394 (13)	3,043 (14)	1,351 (11)	
Adjustment Disorder	8,476 (25)	6,513 (30)	1,963 (16)	
Concussion Syndrome	327 (1)	58 (1)	269 (2)	
Depression	1,855 (6)	1,418 (6)	437 (4)	
Other Mental Disorders	13,425 (39)	9,614 (44)	3,811 (32)	

Appendix E
Characteristics of the Purchased Care Study Sample

Variable	Mean (SD)	Total Sample (%)	Sponsor has Not deployed (%)	Sponsor has Deployed (%)
Sample size		27,300 (100)	27,062 (99)	238 (1)
Dependent:				
Encounters				
Non-Deployed	1.60 (1.21)			
Deployed	1.91 (1.42)			
Predictors:				
Predisposing				
Age				
Non-Deployed	31.55 (18.27)			
Deployed	34.36 (9.00)			
Gender				
Male		10,166 (37)	10,019 (37)	147 (62)
Female		11,044 (63)	17,043 (63)	91 (38)
Beneficiary Category				
Active Duty Dependent	62 (.4)		55 (.3)	7 (.1)
Retired	3,763 (11)		3,433 (15.8)	330 (2.7)
Retired Dependent	530 (1.6)		255 (1.2)	275 (2.3)
Active Duty	29,505 (87)		18,040 (82.7)	11,465 (94.9)
Service Component				
Army	17,134 (63)		16,961 (63)	173 (73)
Air Force	8,101 (30)		8,051 (30)	50 (21)
Marines	484 (1.5)		480 (1)	4 (2)
Navy	1,453 (5)		1,442 (5)	11 (4)
Coast Guard	128 (.5)		128 (1)	
Enabling				
Sponsor Rank Group				
E1-E4 - Jr. Enlisted	1,550 (5)		1,470 (5)	80 (33)
E5-E9 - Sr. Enlisted	16,252 (60)		16,157 (60)	95 (40)
Warrant Officer	640 (2)		640 (3)	
O1-O3 - Jr. Officer	1,492 (6)		1,464 (5)	28 (12)
O4-O10 - Sr. Officer	7,366 (27)		7,331 (27)	35 (15)
Provider Specialty				
Psychiatry	12,280 (44)		12,216 (45)	64 (27)
Psychology	5,469 (20)		5,419 (20)	50 (21)
Certified Clinical				
Social Work	7,405 (27)		7,301 (27)	104 (44)
Mental Health Counselor	2,083 (8)		2,063 (7)	20 (8)
Certified Marriage and Family Counselor	63 (1)		63 (1)	

(continued)

Appendix E

Characteristics of the Purchased Care Study Sample (continued)

Variable	Mean (SD)	Total Sample (%)	Sponsor has Not deployed (%)	Sponsor has Deployed (%)
Need				
Cumulative Days Deployed	265.40 (163.32)			
Mental Health Diagnosis				
PTSD	720 (2.5)	682 (2.5)	38 (16)	
Acute Stress Reaction	74 (.27)	74 (.27)		
Alcohol or Drug Abuse	62 (.22)	62 (.22)		
Adjustment Disorder	3,018 (11)	2,983 (11)	35 (15)	
Concussion Syndrome	2 (.01)	2 (.01)		
Depression	1,282 (5)	1,270 (5)	12 (5)	
Other Mental Disorders	22,142 (81)	21,989 (81)	153 (64)	

Appendix F

Summary of Hierarchical Regression of Direct Care Outpatient Mental Health Use Where the Sponsor has Deployed to GWOT

Population Characteristic	R ²	R ² Change	F Change	Beta	F	p
Full Model	.073	.000	39.58			.000
Predisposing	.002	.002	2.70			.006
Age				-.009	0.607	.436
Gender				.003	0.116	.734
Beneficiary Category						
Active Duty Dependent				-.017	3.648	.056
Retired				-.005	0.277	.600
Retired Dependent				.005	0.262	.609
Active Duty				.004	0.160	.689
Service Component						
Army†				-.021	5.189	.023
Air Force				.015	2.893	.089
Marines				.009	1.075	.300
Navy†				.026	8.970	.003
Coast Guard				---	---	---
Ever Deployed to GWOT						
Enabling	.071	.069	99.52			.000
Sponsor Rank Group						
E1-E4 - Jr. Enlisted				-.011	0.964	.326
E5-E9 - Sr. Enlisted				.009	0.927	.336
Warrant Officer				-.007	0.605	.436
O1-O3 - Jr. Officer				.006	0.501	.479
O4-O10 - Sr. Officer				.009	0.996	.318
Provider Specialty						
Psychiatry†				-.092	84.732	.000
Psychology				.014	2.316	.128
Alcohol or Drug Abuse Counselor†				.215	179.882	.000
Nurse				-.010	0.998	.318
Occupational Therapy				-.014	2.528	.112
Mental Health Tech†				-.063	46.131	.000

(continued)

Appendix F

Summary of Hierarchical Regression of Direct Care Outpatient Mental Health Use Where the Sponsor has Deployed to GWOT (continued)

Population Characteristic	R ²	R ² Change	F Change	Beta	F	p
Need	.073	.002	4.21			.000
Cumulative Days Deployed				.005	0.288	.591
Mental Health Diagnosis						
PTSD†				.045	18.844	.000
Acute Stress Reaction†				.023	5.988	.000
Alcohol or Drug Abuse				.020	1.506	.220
Adjustment Disorder				.004	0.130	.718
Concussion Syndrome				.007	0.545	.460
Depression				-.013	2.062	.151
Other Mental Disorders†				-.028	9.604	.002

Note. Adjusted R² = .071. n = 12077, † statistically significant at the indicated p value

Appendix G

Summary of Hierarchical Regression of Direct Care Outpatient Mental Health Use Where the Sponsor has not Deployed to GWOT

Population Characteristic	R ²	R ² Change	F Change	Beta	F	p
Full Model	.070	.000	68.07			.000
Predisposing	.007	.007	17.74			.000
Age				-.012	0.789	.375
Gender				-.003	0.161	.688
Beneficiary Category						
Active Duty Dependent				.001	0.038	.846
Retired				-.013	1.700	.192
Retired Dependent				.003	0.177	.674
Active Duty				.004	0.160	.689
Service Component						
Army				-.021	4.103	.029
Air Force				.002	0.051	.821
Marines				-.007	1.248	.264
Navy				-.006	0.687	.407
Coast Guard				-.001	0.036	.848
Ever Deployed to GWOT				-.004	0.539	.463
Enabling	.069	.062	159.72			.000
Sponsor Rank Group						
E1-E4 - Jr. Enlisted				.020	3.236	.072
E5-E9 - Sr. Enlisted				.012	2.016	.156
Warrant Officer				-.003	0.218	.641
O1-O3 - Jr. Officer				-.013	3.434	.064
O4-O10 - Sr. Officer				-.009	1.092	.296
Provider Specialty						
Psychiatry†				-.105	232.868	.000
Psychology†				.034	19.954	.000
Alcohol or Drug						
Abuse Counselor†				.271	645.973	.000
Nurse†				.089	160.808	.000
Occupational Therapy				-.004	0.327	.568
Mental Health Tech†				.045	33.524	.000

(continued)

Appendix G

Summary of Hierarchical Regression of Direct Care Outpatient Mental Health Use Where the Sponsor has not Deployed to GWOT (continued)

Population Characteristic	R ²	R ² Change	F Change	Beta	F	p
Need	.070	.001	4.01			.000
Cumulative Days Deployed				---	---	---
Mental Health Diagnosis						
PTSD†				.016	5.290	.021
Acute Stress Reaction				-.005	0.497	.481
Alcohol or Drug Abuse				-.010	0.943	.331
Adjustment Disorder				.009	1.407	.236
Concussion Syndrome†				.027	15.912	.000
Depression				.005	0.638	.424
Other Mental Disorders				-.010	2.028	.155

Note. Adjusted R² = .069. n = 21783, † statistically significant at the indicated p value

Appendix H

Summary of Hierarchical Regression of Purchased Care Outpatient Mental Health Use Where the Sponsor has Deployed to GWOT

Population Characteristic	R ²	R ² Change	F Change	Beta	F	p
Full Model	.221	.000	3.46			.000
Predisposing	.132	.132	4.35			.000
Age				.092	0.460	.498
Gender				.011	0.011	.916
Beneficiary Category						
Active Duty Dependent				.056	0.388	.534
Retired†				-.269	4.048	.045
Retired Dependent†				-.216	5.420	.021
Active Duty				-.018	0.025	.874
Service Component						
Army†				-.020	3.427	.069
Air Force				-.045	0.212	.646
Marines†				.139	4.024	.046
Navy†				-.141	3.865	.049
Coast Guard				---	---	---
Enabling	.201	.069	3.23			.005
Sponsor Rank Group						
E1-E4 - Jr. Enlisted				-.038	0.147	.702
E5-E9 - Sr. Enlisted				-.003	0.001	.979
Warrant Officer				---	---	---
O1-O3 - Jr. Officer				-.038	0.149	.700
O4-O10 - Sr. Officer				-.197	2.353	.127
Provider Specialty						
Psychiatry†				-.222	9.236	.003
Psychology				-.052	0.223	.638
Certified Clinical						
Social Work†				.253	14.661	.000
Mental Health Counselor				-.060	0.506	.478
Certified Marriage and Family Counselor				---	---	---

(continued)

Appendix H

Summary of Hierarchical Regression of Purchased Care Outpatient Mental Health Use Where the Sponsor has Deployed to GWOT (continued)

Population Characteristic	R ²	R ² Change	F Change	Beta	F	p
Need	.221	.020	1.43			.226
Cumulative Days						
Deployed				-.096	1.585	.209
Mental Health Diagnosis						
PTSD†				.045	2.699	.102
Acute Stress Reaction				---	---	---
Alcohol or Drug						
Abuse				---	---	---
Adjustment Disorder				-.016	0.049	.824
Concussion Syndrome				---	---	---
Depression				-.106	2.481	.117
Other Mental						
Disorders†				.119	2.839	.093

Note. Adjusted R² = .158. n = 238, --- = No cases observed in the sample. † = statistically significant at the indicated p value

Appendix I

Summary of Hierarchical Regression of Purchased Care Outpatient Mental Health Use Where the Sponsor has not Deployed to GWOT

Population Characteristic	R ²	R ² Change	F Change	Beta	F	p
Full Model	.105	.000	137.38			.000
Predisposing	.012	.012	36.71			.000
Age				.001	0.001	.987
Gender†				-.042	35.976	.000
Beneficiary Category						
Active Duty Dependent†				.047	6.947	.000
Retired†				.023	8.833	.003
Retired Dependent†				.257	72.863	.000
Active Duty†				.049	69.856	.000
Service Component						
Army				.026	5.577	.053
Air Force				-.007	1.259	.262
Marines				-.008	1.943	.163
Navy				.004	0.406	.524
Coast Guard†				.012	4.088	.043
Enabling	.101	.090	336.98			.000
Sponsor Rank Group						
E1-E4 - Jr. Enlisted†				.016	6.579	.010
E5-E9 - Sr. Enlisted†				-.019	9.840	.002
Warrant Officer				-.003	0.224	.636
O1-O3 - Jr. Officer†				-.012	3.830	.050
O4-O10 - Sr. Officer				.006	1.073	.300
Provider Specialty						
Psychiatry†				-.301	2671.029	.000
Psychology†				.257	1638.064	.000
Certified Clinical						
Social Work†				.282	1859.766	.000
Mental Health Counselor†				.153	631.215	.000
Certified Marriage and						
Family Counselor†				.029	25.150	.000

(continued)

Appendix I

Summary of Hierarchical Regression of Purchased Care Outpatient Mental Health Use Where the Sponsor has not Deployed to GWOT (continued)

Population Characteristic	R ²	R ² Change	F Change	Beta	F	p
Need	.105	.003	15.17			.000
Cumulative Days						
Deployed				---	---	---
Mental Health Diagnosis						
PTSD				.011	3.523	.061
Acute Stress Reaction				.001	0.001	.984
Alcohol or Drug						
Abuse				.007	1.558	.212
Adjustment Disorder†				.007	40.768	.000
Concussion Syndrome†				.025	18.723	.000
Depression†				-.031	28.376	.000
Other Mental						
Disorders				-.010	2.028	.155

Note. Adjusted R² = .104. n = 27062, --- = No cases observed in the sample. † = statistically significant at the indicated p value

Appendix J

Definition of Terms

Andersen Behavioral Model: A model originally developed in 1968, with several variations over the years, to study health care use, access to the health care system, the external environment and the effects that each have on the others.

Behavioral Health: The military term for mental health and related problems.

DoD: Department of Defense. A Federal government office that oversees all U.S. military service branches.

Dependents: Family members of a uniformed service sponsor (active duty, reservists or retired) who are eligible to receive care through the Military Health System.

Enrollment site: A field in M2 that identifies the MTF where the beneficiary is enrolled at the time of service.

GWOT: Global War on Terror or simply the War on Terror. This term refers to the global efforts to address threats to national security, often involving military manpower and resources. The main area of operations for these activities focus on combat operations in Iraq and Afghanistan.

MEPRS3 Code: An alphabetical code in M2 that identifies the first three characters of the Treatment Service Clinic Code. For behavioral health, these codes are BFA through BFF.

MHS: Military Health System. A Federal government office whose mission is to enhance DoD and our Nation's security by providing health support for the full range of military operations and sustaining the health of all those entrusted to our care. The MHS controls the TRICARE program providing health services to military members and their families.

MTF: Medical Treatment Facility. These military hospitals and health clinics vary in size and specialty care available. They are located on military bases world-wide.

OEF: Operation Enduring Freedom. The war in Afghanistan.

OIF: Operation Iraqi Freedom. The war in Iraq.

Operational: This is a term used to refer to activities in support of a military mission.

OPTEMPO: Operational Tempo is the pace of military operations and the ratio of time a unit spends at home to the time they are deployed.

Theater: This is a term used to refer to areas where military operations are taking place. It is often used to refer to the combat zones in Iraq and Afghanistan.

Treatment DMIS ID: A code in M2 that identifies the MTF responsible for the treatment of the patient during the episode of care.

TRICARE: The Military Health System's community-based services.